

Amendments to the Claims:

Please cancel claims 34 and 84. Please amend claims 1-3, 11-16, 18, 21, 24, 26, 28-34, 35-36, 38-43, 49, 53-55, 59-64, 71, 74-77, 79-80 and 83 as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
- (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
- (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
- (d) generating a current message allocation based on said current message state;
wherein at least one of steps (a)-(d) is performed by at least one processing device.

2. (currently amended) The method in claim 1, wherein said method further comprising step of:

- (e) storing said current message state as prior stage message state for a next iteration of said method.

3. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
- (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
- (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
- (d) generating a current message allocation based on said current message state;

wherein said cumulative number of trials and said cumulative number of successes comprise discounted cumulative number of trials and discounted cumulative number of successes;

wherein at least one of steps (a)-(d) is performed by at least one processing device.

4. (previously amended) The method in claim 1, wherein said prior stage message state comprises reading a state vector for the prior stage in a message campaign.

5. (original) The method in claim 1, further comprising the step of storing said initial state vector in a database.

6. (original) The method in claim 1, wherein said step of generating a current message allocation further includes applying a message allocation constraint.

7. (original) The method in claim 1, further including the step of storing said current message allocation in a database.

8. (original) The method in claim 2, further including repeating steps (a)-(e) for each stage in said message campaign.

9. (original) The method in claim 1, wherein said message comprises a web banner ad.

10. (original) The method in claim 1, wherein said message comprises an email.

11. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

(a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;

(b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;

(c) computing a current message state on the basis of said prior stage message state and said message performance results;

(d) generating a current message allocation based on said current message state;

(e) storing said current message state as prior stage message state for a next iteration of said method; and

(f) repeating steps (a)-(e) for each stage in said message campaign;

wherein said cumulative number of trials and said cumulative number of successes comprise discounted cumulative number of trials and discounted cumulative number of successes;

wherein said prior stage message state comprises reading a state vector for the prior stage in a message campaign;

wherein said step of generating a current message allocation further includes applying a message allocation constraint; and

wherein said message is selected from the group of messages consisting of an advertisement, an email, and combinations thereof;

wherein at least one of steps (a)-(f) is performed by at least one processing device.

12. (currently amended) The method in claim 1, wherein said current message state is updated at the end of each state of a message campaign to reflect the performance results of that stage.

13. (currently amended) The method in claim 1, wherein said current message state stores information that has been collected on a given message.

14. (currently amended) The method in claim 1, wherein said message comprises an advertisement, and said current message state stores ~~all of the~~ information that has been collected for said advertisement.

15. (currently amended) The method in claim 1, wherein said message comprises an internet web site banner advertisement and said current message state stores ~~all~~ information that has been collected for said banner advertisement at a given zone.

16. (currently amended) The method in claim 1, wherein said message comprises an email message and said current message state stores ~~all of the~~ information that has been collected for said email message.

17. (original) The method in claim 1, wherein said message comprises a banner advertisement and a constraints list stores any constraints on the allocation of banner ads to impressions.

18. (currently Amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium, wherein the message comprises a banner advertisement and a constraints list stores any constraints on the allocation of banner ads to impressions; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (ⁱth) message at the end of said prior stage;
- (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage state;
- (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
- (d) generating a current message allocation based on said current message state; wherein said constraints includes a minimum number of banners to be retained at each stage of an ad campaign and the identity of particular banners to be excluded from any zones; wherein at least one of steps (a)-(d) is performed by at least one processing device.

19. (canceled)

20. (original) The method in claim 1, wherein said step of (b) of reading message performance results further comprises storing said performance results of the most recent stage of the message campaign in a results vector.

21. (currently amended) The method in claim 20, wherein said message comprises an advertisement, and said results vector stores the results of the a most recent stage of the advertising campaign.

22. (original) The method in claim 1, wherein said step (d) of generating a current message allocation further comprises storing a current message allocation into an allocations vector.

23. (original) The method in claim 22, wherein said allocations vector stores an allocation of banners to available impressions for a future stage in the campaign.

24. (currently amended) The method in claim ~~23~~ 22, wherein said allocations vector stores an allocation of messages to available trials for a future stage in the campaign.

25. (original) The method in claim 24, wherein said future stage is a next stage.

26. (currently amended) The method in claim 1, wherein said step (d) of generating a current message allocation uses performance results ~~form~~ from all prior stages in the message campaign.

27. (original) The method in claim 1, wherein said step (d) of generating a current message allocation uses performance results form at least one prior stage in the campaign.

28. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
 - (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
 - (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
 - (d) generating a current message allocation based on said current message state using results ~~from~~ from a predetermined number of the most recent prior stages in the campaign;
- wherein at least one of steps (a)-(d) is performed by at least one processing device.

29. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
 - (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
 - (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
 - (d) generating a current message allocation based on said current message state using weighted results from a predetermined number of the most recent prior stages in the campaign so that more recent results are weighted more heavily than older results;
- wherein at least one of steps (a)-(d) is performed by at least one processing device.

30. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
 - (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
 - (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
 - (d) generating a current message allocation based on said current message state;
- wherein, when multiple zones are possible for a message, said steps (a)-(d) are applied separately for each zone on a zone-by-zone basis;
- wherein at least one of steps (a)-(d) is performed by at least one processing device.

31. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
 - (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
 - (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
 - (d) generating a current message allocation based on said current message state;
- wherein said performance results are discounted when computing ~~said~~ a current state vector;
- wherein at least one of steps (a)-(d) is performed by at least one processing device.

32. (currently amended) The method in claim 31, wherein ~~said discounting is in the form of the performance results are discounted using~~ a binary step function where performance data older than a ~~certain~~ given stage is ignored and performance data newer than a ~~particular~~ the given stage is considered equally.

33. (currently amended) The method in claim 31, wherein ~~said discounting is in the form of the performance results are discounted using~~ a weighting function wherein newer performance data is weighted more heavily than older performance data.

34. (currently amended) The method in claim 33, wherein said weighting function is a linear or non-linear function of stage.

34. (cancelled)

35. (currently amended) The method in claim 31, wherein ~~said discounting comprises the performance results are discounted by~~ geometrical discounting where, at each stage, each performance data is discounted according to a geometrical discounting function.

36. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

(a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;

(b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;

(c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state; ~~said discounting comprises geometrical discounting where~~ wherein, at each stage, each performance data is discounted according to a geometrical discounting function; ~~and~~

~~said geometrical discounting comprises multiplying~~ wherein the geometrical discounting function multiplies each performance result at each stage by a number of one-stage discount factors β , where β is less-than-or-equal-to 1 ($\beta \leq 1$), corresponding to the number of stages, such

that performance data that is n stages old at the time of execution are multiplied by β raised to the n power (β^n);

wherein at least one of steps (a)-(d) is performed by at least one processing device.

37. (original) The method in claim 36, wherein the one-stage discount factor $\beta < 1$.
38. (currently amended) The method in claim 36, wherein ~~where~~ β is in ~~the~~ a range between about 0 and about 0.99.
39. (currently amended) The method in claim 36, wherein ~~where~~ β is in ~~the~~ a range between about 0.5 and about 1.0.
40. (currently amended) The method in claim 36, wherein ~~where~~ β is in ~~the~~ a range between about 0.8 and about 1.0.
41. (currently amended) The method in claim 36, wherein ~~where~~ β is in ~~the~~ a range between about 0.85 and about 0.95.
42. (currently amended) The method in claim 36, wherein ~~where~~ β is substantially 0.9.
43. (currently Amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:
- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
 - (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
 - (c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state;
wherein said message is a banner ad, and said state comprises a state vector having a first state vector component $s_i(t)$ for the total number of discounted cumulative clicks for banner i at the end of stage t , and a second state vector component $n_i(t)$ for the cumulative number of impressions for banner i at the end of stage t ;
wherein at least one of steps (a)-(d) is performed by at least one processing device.

44. (original) The method in claim 43, wherein:

$$s_i(t) = \beta s_i(t-1) + \text{click}_i(t-1), \text{ for } t \geq 2 ;$$

$$n_i(t) = \beta n_i(t-1) + \text{imp}_i(t-1), \text{ for } t \geq 2; \text{ and}$$

$$s_i(1) = 0 \text{ and } n_i(1) = 0; \text{ and}$$

where:

$\text{imp}_i(t)$ is the total number of impressions for banner i in stage t ;

$\text{click}_i(t)$ represent the total number of clicks for banner i in stage t ; and

β is a one stage discounting factor.

45. (original) The method in claim 44, wherein $\beta \leq 1$.

46. (original) The method in claim 43, wherein said state comprises a first state vector component $s_i(t)$ for the total number of discounted cumulative clicks for message i at the end of stage t , and a second state vector component $n_i(t)$ for the cumulative number of impressions for banner i at the end of stage t .

47. The method in claim 46, wherein:

$$s_i(t) = G\{ \text{click}_i(1), \dots, \text{click}_i(t-2), \text{click}_i(t-1) \}, \text{ for } t \geq 2 ; \text{ and}$$

$$n_i(t) = G\{ \text{imp}_i(1), \dots, \text{imp}_i(t-2), \text{imp}_i(t-1) \}, \text{ for } t \geq 2 ;$$

where $s_i(1) = 0$ and $n_i(1) = 0$; and

where:

$\text{imp}_i(t)$ is the total number of impressions for banner i in stage t ;

$\text{click}_i(t)$ represent the total number of clicks for banner i in stage t ; and

$G\{\dots\}$ is a discounting function.

48. (original) The method in claim 47, wherein $G\{\dots\}$ is a geometric discounting function.

49. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
- (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
- (c) computing a current message state on the basis of said prior stage message state and said message performance results; and
- (d) generating a current message allocation based on said current message state; wherein, at each stage, the available messages are partitioned into a first group of contending messages that remain in contention to become the a best performing message, and a second group that are not in contention to become the best performing message; wherein at least one of steps (a)-(d) is performed by at least one processing device.

50. (original) The method in claim 49, wherein said message comprises a banner ad.

51. (original) The method in claim 49, wherein said message comprises an email.

52. (original) The method in claim 49, wherein the available messages are further partitioned into a third group of unavailable messages for messages constrained not to be used on the given zone during a particular stage.

53. (currently amended) The method in claim ~~49~~ 52, wherein each of said ~~contender~~ first group, said ~~non-contender~~ second group, and said ~~unavailable~~ third group may have none, one, or a plurality of members.

54. (currently amended) The method in claim 49, wherein a first proportion (γ) of ~~the~~ total available impressions are allocated to non-contenders at each stage and a second proportion $(1-\gamma)$ of the total available impressions are allocated to contenders at each stage, at the beginning of a campaign.

55. (currently amended) The method in claim 49, wherein ~~the~~ alternatives for each message are compared on a pair-wise basis to ~~the~~ alternatives for each other message to determine ~~the~~ a better performing set of ~~the two~~ pair-wise compared messages.

56. (original) The method in claim 55, wherein the message comprises a banner ad.

57. (original) The method in claim 55, wherein the message comprises an email.

58. (original) The method in claim 57, wherein the email message includes an attachment.

59. (currently amended) The message in claim ~~55~~ 56, wherein, if a particular banner ad loses ~~one of these~~ a pair-wise ~~comparisons~~ comparison by having a significantly lower success rate than another banner ad, ~~then that~~ the particular banner ad is designated as a non-contender.

60. (currently amended) The method in claim 55, wherein ~~said~~ pair-wise ~~procedure~~ comparison guarantees that at least one contender will remain.

61. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

(a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;

(b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;

(c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state;

wherein said message is selected from the group of messages consisting ~~of~~ of an advertisement, an internet web site banner ad, an email, an email advertisement, an email having ~~an~~ an advertisement attachment, a solicitation, an interactive television message, and combinations thereof;

wherein at least one of steps (a)-(d) is performed by at least one processing device.

62. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

(a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;

(b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;

(c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state;

wherein for providing more than two groups of alternatives, the alternatives are divided into multiple sets based on a performance value;

wherein at least one of steps (a)-(d) is performed by at least one processing device.

63. (currently amended) The method in claim 62, wherein ~~the~~ a number of impressions allocated to ~~all~~ alternatives within a set are equal and the a number of sets ~~are~~ is equal to the number of alternatives.

64. (currently amended) A method for improving the stage-to-stage performance of a message in a multi-stage message campaign in an interactive measurable medium; said method including steps of:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular (i^{th}) message at the end of said prior stage;
- (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
- (c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state; wherein the state comprises a first state vector component $s_i(t)$ for the total number of discounted cumulative successes for message i at the end of stage t , and a second state vector component $n_i(t)$ for the cumulative number of trials for message i at the end of stage t ; wherein at least one of steps (a)-(d) is performed by at least one processing device.

65. (original) The method in claim 64, wherein:

$s_i(t) = H\{ \text{success}_i(1), \dots, \text{success}_i(t-2), \text{success}_i(t-1) \}$, for $t \geq 2$; and

$n_i(t) = H\{ \text{trial}_i(1), \dots, \text{trial}_i(t-1), \text{trial}_i(t-1) \}$, for $t \geq 2$;

where $s_i(1) = 0$ and $n_i(1) = 0$;

$\text{success}_i(t)$ is the number of successful outcomes for message i at stage t ;

$\text{trial}_i(t)$ is the number of trials of message i at stage t ; and

$H\{\dots\}$ is a functional operator of the bracketed parameters.

66. (original) The method in claim 65, wherein $H\{\dots\}$ comprises a weighting function of trials and successes.

67. (original) The method in claim 65, wherein $H\{\dots\}$ comprises a geometric discounting function wherein newer state data is counted more heavily than older state data.

68. (original) The method in claim 54, wherein said first proportion (γ) of the total available impressions is between about 0 and about 0.5.

69. (original) The method in claim 54, wherein said first proportion (γ) of the total available impressions is between about 0.01 and about 0.05.

70. (original) The method in claim 54, wherein said first proportion (γ) of the total available impressions is between about 0.02 and about 0.03.

71. (currently amended) The method in claim 55, wherein ~~said~~ the pair-wise comparison determines relative success rates for the two message alternatives ~~banners under consideration~~ utilizing a cutoff threshold value.

72. (original) The method in claim 71, wherein said cutoff threshold value is a value between about 0.5 and about 1.0.

73. (original) The method in claim 71, wherein said cutoff threshold value is a value of about 1/2.

74. (currently amended) A computer program for use in conjunction with a computer system, the computer program comprising a computer program mechanism embedded therein, the computer program mechanism, comprising:

a program module that directs the computer system to improving the stage-to-stage performance of a message in a multi-stage message, the program module including instructions for performing a method comprising:

(a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular message at the end of said prior stage;

(b) reading message performance results representing message trials and message successes from said prior stage based on said prior message stage state;

(c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state.

75. (currently amended) The computer program in claim 74, wherein said program module further including instructions for:

(e) storing said current message state as prior stage message state for a next iteration of said method.

76. (currently amended) A computer program for use in conjunction with a computer system, the computer program comprising a computer program mechanism embedded therein, the computer program mechanism, comprising:

a program module that directs the computer system to improving the stage-to-stage performance of a message in a multi-stage message, the program module including tangible instructions for performing a method comprising:

(a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular message at the end of said prior stage;

(b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;

(c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state; wherein said cumulative number of trials and said cumulative number of successes comprise discounted cumulative number of trials and discounted cumulative number of successes.

77. (previously amended) The computer program in claim 74, wherein said prior stage message state comprises reading a state vector for the prior stage in a message campaign.

78. (original) The computer program in claim 74, wherein said step of generating a current message allocation further includes applying a message allocation constraint.

79. (currently amended) The computer program in claim ~~74~~ 75, wherein said program module further includes instructions for repeating steps (a)-(e) for each stage in said message campaign.

80. (currently amended) A computer program for use in conjunction with a computer system, the computer program comprising a computer program mechanism embedded therein, the computer program mechanism, comprising:

a program module that directs the computer system to improving the stage-to-stage performance of a message in a multi-stage message, the program module including tangible instructions for performing a method comprising:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular message at the end of said prior stage;
- (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
- (c) computing a current message state on the basis of said prior stage message state and said message performance results;
- (d) generating a current message allocation based on said current message state;
- (e) storing said current message state as prior stage message state for a next iteration of said method; and
- (f) repeating steps (a)-(e) for each stage in said message campaign;

wherein said cumulative number of trials and said cumulative number of successes comprise discounted cumulative number of trials and discounted cumulative number of successes;

wherein said prior stage message state comprises reading a state vector for the prior stage in a message campaign;

wherein said step of generating a current message allocation further includes applying a message allocation constraint; and

wherein said message selected from the group of messages consisting of an advertisement, an email, and combinations thereof.

81. (original) The computer program of claim 74, further comprising a tangible computer readable storage medium wherein the computer program is stored on the tangible computer readable storage medium.

82. (original) The computer program of claim 81, wherein said tangible computer readable storage medium is a medium selected from the group consisting of a magnetic storage medium, a solid-state memory device, an optical storage medium, a CD-ROM disk, a DVD disc, a floppy-disc, and combinations thereof.

83. (currently amended) A computer system comprising:
a server having a processor and a memory coupled to said processor;
an internet interface means for coupling said processor to the internet;
means for receiving performance results from a message service coupled to said internet;
means for transmitting a message allocation to said message service;
a message optimization procedure implemented as a computer program and comprising a computer program mechanism embedded therein and stored in said memory and executing in said processor;

said computer program mechanism, comprising a program module that directs the computer system to improving the stage-to-stage performance of a message in a multi-stage message, the program module including tangible instructions for performing a method comprising:

- (a) reading prior stage message state pertaining to a prior stage in a message campaign; said prior stage message state including a cumulative number of trials and a cumulative number of successes for a particular message at the end of said prior stage;
- (b) reading message performance results representing message trials and message successes from said prior stage based on said prior stage message state;
- (c) computing a current message state on the basis of said prior stage message state and said message performance results; and

(d) generating a current message allocation based on said current message state.

84. (canceled)